

# FOREST ACCOUNTING AT FAIR VALUE: AN EVALUATION OF STRENGTHS AND POSSIBILITIES TO MINIMISE SHORTCOMINGS

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**Abstract.** *The accounting standards provide options for different accounting methods to be deployed in accounting of certain assets. However, in other cases, only one of the specified methods should be applied. The forest (stands), the main resource of forestry enterprises, is also attributed to this category of assets, which, according to the standard IAS 41 Agriculture, should be accounted for only at fair value. The aim of the paper is to identify the strengths and shortcomings of applying the concept of fair value to forest financial accounting and to evaluate the possibilities to minimise the disadvantages. The study examines the scholarly literature and deploys the theoretical methods of comparative analysis, critical evaluation, systematisation, generalisation. The empirical research involves the document content analysis, expert assessment methods.*

*The paper examines the issues of applying the fair value concept to forestry accounting: forest valuation at fair value in financial statements reflects the forest biological transformation and the impact of market price changes on the value of the forest. However, the main disadvantage of this method is the fact that the forest often does not have an active market with quoted prices. Thus, its fair value is determined using different valuation methods, often based on subjective assumptions resulting in financial information which can be unreliable and difficult to verify. Furthermore, the profit and loss accounts including the recognition of the change in the fair value of the forest to be sold in the forthcoming decades are not only doubtful, but may also lead to false interpretations of the financial indicators and contradict to the prudence principle. Based on the conclusions of expert evaluation of certain aspects of forest accounting at fair value, the research study offers a modified method of forest accounting at fair value which facilitates minimisation of the shortcomings.*

**Keywords:** *accounting methods, fair value, financial statements, forest (stands), IAS 41.*

## Introduction

Today's business success of enterprises, exposed to modern business management, changing competitive markets and abundant flows of information, can only be enhanced by the availability of the relevant and reliable financial information, on the basis of which rational and effective economic decisions in business management, investment and other fields can be made. The meaning of

information on the entity's assets and financial performance results, presented in the financial statements, largely depends on the use of accounting methods based on two concepts: accounting at historical cost and accounting at fair value. None of the concepts is ideal: the fair value is misleading in terms of the profit and loss account, historical cost – in terms of the balance sheet (Alexander & Fasiello (2014). Accounting standards frequently provide options for different accounting methods to be deployed in accounting of certain assets. However, in other cases, only one of the specified methods should be applied. The forest (stands), which is not only of particular importance to the society, but also the main resource of forestry enterprises, is also attributed to this category of assets, which, according to the IAS 41 Agriculture, should be accounted for only at fair value.

The scientific literature has been broadly examining the concept of fair value – both, in terms of its theoretical and conceptual aspects and its practical application. Other authors, such as C. Elad (2004), K. Herbohn and H. Herbohn (2006), H. A. Jöbstl (2009), K. Herbohn (2009), W. Tzschupke (2009), K. Wallner (2009), B. J. Epstein and E. K. Jermakowicz (2010), C. Elad and K. Herbohn (2011), Y. H. Aryanto (2011), D. Dvořáková (2011), I. V. Zamula and O. V. Shavurska (2015), M. Stárová et al. (2016) studied the advantages and limitations of the use of the fair value method or the application of some of its aspects for the financial accounting of forests. Although all of the authors demonstrate a larger or smaller degree of criticism of the fair value approach, all of them express the need for its improvement in order to adapt it to the financial accounting of forests. However, the problems encountered in applying the fair value method for the forest financial accounting remain unresolved.

The aim of the paper is to identify the strengths and shortcomings of applying the concept of fair value to forest financial accounting and to evaluate the possibilities to minimise the disadvantages. The research study examines the scholarly literature and deploys the theoretical methods of comparative analysis, critical evaluation, systematisation, generalisation. The empirical research involves the document content analysis, expert assessment methods.

### **Strengths and shortcomings of forest accounting at fair value**

Accounting at fair value is a concept of financial accounting that requires assets and liabilities to be presented at fair value in the financial statements. The benefits of fair value accounting are obvious - the information available in the financial statements becomes more relevant and favourable in terms of economic decision making and cash flow projections, reflects changes in the market and their impact on the company's activities. Moreover, accounting at fair value is more consistent with the time the accounting information was presented, creates a clear picture for investors, for users of financial statements – better understanding

of valuation at fair value rather than at cost (Miller & Bahnson, 2009; Ristea & Jianu, 2010; Argiles et al., 2011; Hodder et al., 2014; Palea, 2014).

The use of the fair value method in accounting for forests managed by forestry enterprises requires that the forests in the balance sheet should be presented at fair value. This procedure is not only significantly more relevant to the adoption of economic decisions, especially those related to the long-term prospects of the company, but also allows the financial statements to include the forecast of future cash flows, the reflection of the forest bio-transformation and the impact of changes in the market situation. Miller & Bahnson (2009), Stárová et al. (2016) claim that another alternative in accounting, a historic cost-based approach, when only forest planting and maintenance costs are included in the value of stands or even worse – written off as expenses, does not adequately reflect this resource in the financial statements of the forestry companies. Therefore, such accounting *de facto* does not perform its main function to provide useful information to the users. Dvořáková (2011) argues that the main factor determining the change in the value of forests is its biological transformation over a very long period of growth that can only be reflected by the fair value method, while the cost method does not disclose the real financial situation of forestry enterprises, because the costs of forest growth and maintenance largely do not impact the increase of the forest value. Despite the benefits of fair value, many authors criticise the application of this approach to the accounting of biological assets, and, in particular, forests.

Fischer & Marsh (2013) claim that, before IAS 41 *Agriculture* entered into force, biological property accounting practices were based on historic cost: this practice was concrete, verifiable and understandable, while the use of fair value contradicts the main accounting principles, the financial statements are based on estimates and opinions rather than evidence. It weakens the accounting information, increases chances for management malpractice, encourages litigation and makes it difficult for auditors to express their opinion on financial statements (Fischer & Marsh, 2013; Muhammad, 2014).

It has to be recognised that forests, as a specific asset of forestry enterprises, often do not have the quoted prices on the active market, so the fair value of forests is determined on the basis of certain valuation methodologies and rather subjective assumptions. This is confirmed by the conclusions of the research carried out by Herbon (2009), who states that the determination of the fair value of a forest is a very subjective process that creates favourable conditions for managerial manipulation, and the possibility of using different valuation methods makes it difficult to compare the estimates, especially in the context of superficial disclosures observed in explanatory notes.

Elad & Herbohn (2011), Goncalves & Lopes (2014) also highlight the failure or lack of disclosure of fair value determination in explanatory notes. Stárová et al.

(2016) points out that the application of different methods in determining the fair value of a forest may increase the incomparability of the financial statements of enterprises, while the objective of the fair value concept is to reduce it. Herbohn & Herbohn (2006) emphasise that the problems occur in distinguishing the fair value from the value of the land, as well as in determining the fair value of young stands without an active market. According to Jöbstl (2009), it is difficult to choose the appropriate forest valuation method, and when determining the fair value, there is a problem of forecasting the prices for future production and the scope of activities. A similar conclusion was made by Tzschupke (2009) who also stressed that there is no consensus on the best method for assessing forests, which leads to incomparable results of enterprises. Indeed, if an asset does not have an active market with quoted prices, an enterprise may determine the fair value of the asset using a variety of valuation methods, ranging from future discounted cash flows to cost. The results of applying different methods can vary widely, which has a direct impact on the balance sheet value of an asset and on the outcomes of the entity's performance. Although the opinion of a human or an institution on the fair value of an asset cannot be completely accurate or correct due to different assessment circumstances, the perception of the market situation (the determination of an asset value is not just an ordinary mathematical step, but it involves evaluating important assumptions), it must be recognised that the variety of forest fair value methods can lead to a lower level of comparability of information provided in financial statements. Thus, it is necessary to create a unified approach in determining the fair value of forests. Also, in their explanatory notes, enterprises have to provide a clear and detailed description of forest fair value measurement methods and assumptions used for valuation purposes.

In addition to the doubtful credibility level of evaluation, Elad (2004), Herbohn (2009) identified another no less important aspect of applying the fair value method - recognition of fair value changes in the profit and loss account that distorts the real results of the performance of a company. Herbohn (2009) found out that after starting to evaluate forests at their fair value, the enterprises that were investigated for the changes in the fair value of biological assets over the four-year period, increased their net profit margin from 8.5 % to 15 %, the *fluctuations* of net profit values strongly increased due to the constant change in the value of the forest, influenced by the changing world prices of timber, state policy decisions, natural phenomena. Fischer and Marsh (2013), Stárová et al. (2016) point out that the application of the fair value method may lead to the issue of dividends that are not based on the required cash flows. According to Wallner (2009), the presentation of changes in the fair value of forests in revenues may lead to erroneous financial decisions and an increase in the company's liquidity risk, and, at the same time, the need for complex risk management instruments. Moreover, Epstein and Jermakowicz (2010) note that, like some other plants, the

forest has a very long cycle of growth (production), which determines the need to record changes in the fair value and to show these changes in the profit and loss account for each reporting period. Otherwise, the information would be distorted, since, in the case of a cost method, income from such assets would be shown only at a certain interval of time, which would not adequately reflect the economic performance of the enterprise (Epstein & Jermakowicz, 2010). However, it should be noted that the presentation of a fair value change in the profit and loss account may mislead users of accounting information and even contradict the general principle of prudence: in the profit and loss account, entities present revenues recognised on an accrual basis, but only when they are certain that the economic benefits *will be gained*. Meanwhile, using the fair value method, the profit and loss account shows *only potential* revenues.

Although, according to Ramanna (2008), the fair value allows enterprises to present information in their financial statements reflecting current market conditions and is changed in line with market changes, while profit and losses are not recognised when the transaction is completed, but when that profit or loss on holding an asset or liability arise, however, such an approach and income presentation method are more appropriate for fairly high liquidity assets when their fair value change profit can be quickly realised. In the meantime, the forest under development, especially immature, is an asset of a relatively low liquidity, with its fair value increase revenues to be realised (perhaps) only in a relatively long time in the future. Therefore, the preliminary presentation of the change on fair value of the forest in the profit and loss account may lead to erroneous profit distribution decisions and false interpretation of financial indicators as well as encourage the management of the company to manipulate the estimates seeking to achieve the results set by the owners of the company. The problem of the presentation of the unrealised revenues of the fair value change in the profit and loss account can be solved by modifying the report or the method, and the modification itself could be based on another type of presentation of the changes in the forest fair value in the financial statements.

### **Methodology of research into minimising weaknesses in forest accounting at fair value**

At the first stage of the research, in order to examine the drawbacks in financial accounting at the fair value that affect the financial accounting practices of forests, the method of the document content analysis was applied. The major focus of the document content analysis is the official legal documents of a high level of information reliability, in this case, the International Financial Reporting Standards (IFRS), approved by the EU Commission, which regulate forestry accounting. The document content analysis was performed by applying a

traditional mechanism for understanding the document text. Due to the specificity of the phenomenon under analysis, aiming to assess the advantages and the potential to minimise the deficiencies of forest financial accounting at fair value, in the second stage of the research, the authors deployed an expert evaluation method. This approach is widely used when the complex problem cannot be solved by quantitative methods, but the benefits can be derived from subjective collective assessments. It is suitable for the research of the causes of hidden, complex, interrelated or multidimensional social processes where quantitative data may be biased, inaccurate or difficult to access, and is often useful in developing new theories, exploring the specific context, unique or exceptional processes (Bhattacharjee, 2012).

The financial accounting of business enterprises is usually governed by the relevant legal acts, therefore, professionals responsible for developing and improving the country's corporate accounting system should have deep knowledge of the accounting theory as well as the problems of specific accounting areas. These criteria determined the exclusion of the first target segment of experts – professionals of the institutions responsible for the regulation of financial accounting. To avoid the experts being involved solely in the field of financial accounting regulation, the second segment involved experts with working experience in forestry enterprises - auditors who have audited forestry enterprises over the past 5 years, thus, with understanding of the accounting problems and specificities of forestry enterprises.

The optimal group of experts should consist of 5-10 people, because a large number of experts hinders the formation of a common opinion, and based on the classical theory of tests, the reliability of aggregated solutions and the number of decision-makers (experts) are associated with a rapidly decelerating nonlinear connection (Augustinaitis et al., 2009). The list of experts was compiled using a non-probability sampling method. The questionnaire was submitted to ten experts, among them: 5 experts were from the Audit, Accounting and Insolvency Department of the Ministry of Finance of the Republic of Lithuania and from the Business Accounting Standards Committee under the Ministry of Finance, with experience of 2 to 18 years in the field of regulation of financial accounting; 5 experts were certified auditors with over 15 years of experience in auditing, who performed audits of forestry companies over the last five years. An expert assessment questionnaire was submitted to the selected experts, the main part of which was the group of claims for: 1) the modification of the fair value method of accounting for stands; 2) the principles for determining the fair value of the forest; 3) improvement of forest financial accounting process. The responses were assessed on the 5-level Likert item scale.

When making decisions on the basis of expert evaluation, it is necessary to assess the degree of compatibility of the opinions of the experts themselves, as

their attitudes to the problem can not only vary, but can also be contradictory. The consistency of expert opinions is most commonly assessed using non-parametric statistics - Kendall's coefficient of concordance ( $W$ ). When no coinciding ranks are observed in the expert evaluation, the coefficient is calculated according to the formula (Podvezko, 2005):

$$W = \frac{12 S}{r^2 m(m^2 - 1)} = \frac{12 S}{r^2 (m^3 - m)} \quad (1)$$

If the expert rating has coinciding ranks, the coefficient ( $W_r$ ) is calculated according to the formula (Podvezko, 2005):

$$W_r = \frac{12 S}{r^2 (m^3 - m) - r \sum_{j=1}^r T_j} \quad (2)$$

Values of formula variables:

$W$  – Kendall concordance coefficient;

$S$  – the sum of the S-indicators rank deviations from the mean squares;

$r$  – number of experts;

$m$  – number of objects (indicators);

$T$  – number of coinciding ranks in a row.

An expert evaluation was carried out in February of 2017. The questionnaires to the experts were sent individually, by email. Thus, they did not influence each other's views.

### **Results of the research and modification of the method of forest accounting at fair value**

The analysis of the IFRS content revealed that the accounting standards present only the general principles for the presentation of forest and forest land in financial statements: forest stands should be accounted for in accordance with IAS 41, while IAS 16 *Property, Plant and Equipment* or IAS 40 *Investment Property* apply to forest land accounting. Forests (stands) at the date of initial recognition and at each balance sheet date must be measured at their fair value less estimated costs to sell. Their fair value must be determined on the basis of the active market, but if it does not exist, using other methods of determining fair value. An exception to the fair value measurement indicated in the IAS 41 is important in forest accounting: the fair value of biological assets may be close to their costs, especially in cases when costs were spent on biological assets for the first time resulting in its insignificant biological change, or biological changes are not expected to have a significant effect on price, for example, during the growing

season of pine plantations of up to thirty years. The gain on changes in the fair value of a forest must be included in the profit or loss for the reporting period in which they are generated (Commission Regulation ..., 2008).

However, IAS 41 does not regulate accounting for forest development and maintenance costs, i.e. it is not effectively specified whether these costs need to be capitalised or recognised as expenses of the reporting period. IAS 41 refers to the concept of “growth”, i.e. profit should be recognised at the time of the growth of biological assets, and the concept itself is based on the following arguments: 1) biological assets can be sold at any stage of its growth; 2) when assets (stands) grow, their value only increases. Therefore, the income of biological assets is recognised, although not yet realised, provided that realisation is inevitable and is just a matter of time (Aryanto, 2011). Nevertheless, because of the long forest development cycle, its changes in the fair value would be more accurately included into profit or loss when the profit-making process *ends* (the forest is sold standing or after felling) rather than when these changes take place during the development of the forest. Furthermore, the results of forest biotransformation may not be realised due to the effects of fires, storms, pests and similar phenomena.

Therefore, it would be worthy to look for another way of presenting a change in the fair value of forests in the financial statements, which, on the one hand, reflects the impact of the change in the forest biological transformation and the changes in market conditions on the balance sheet value, but, on the other hand, would not affect the results of activities of the business entity before the realisation moment. Some authors suggest minimising this shortcoming by providing alternative profit and loss statements or recognising only the gain from forest biotransformation in the profit and loss account, while the effect of price changes on the forest shall be accumulated in the revaluation reserve (Stárová et al., 2016). According to Aryanto (2011), it is possible to consider the accumulation of a fair value gain of biological asset grown for a very long time, in other comprehensive income. We believe that the change in the fair value of the forest, which will be realised in the long-term future, should not be reflected in the profit or loss of the reporting period, but could be accumulated in equity, in the revaluation reserve until the realisation of the forest (stands).

In applying this method for presentation of fair value changes, forests in accounting could be recorded at cost which could be considered as a substitute for fair value until a slight biological transformation of the stands is going on or bio-change is not expected to have a significant effect on the price, for example, in the period of development of young stands, when cutting down of the small trees and shrubs takes place, and the resulting forestry production is insignificant and worthless. Although some authors (Dvořáková, 2011; Zamula & Shavurska, 2015) suggest that only mature stands should be valued at fair value, we believe



that such an assessment should be made earlier when the biological transformation of the stands begins to affect their fair value. From then on, the forest stands in financial statements should be revalued to fair value through the reporting of their changes in the revaluation reserve, in which the accumulated amount would be transferred to the profit and loss account when the standing or felled forest is sold. After implementing this modification of the fair value method, the costs of forest planting and subsequent forest development and care should be capitalised, since the recognition of these costs as expenses in the profit and loss account would distort the meaning of the principle of comparing. The revaluation reserve would accumulate the gain from the unrealised change in fair value after deduction of the amount of capitalised development and maintenance costs incurred during the period.

An expert evaluation was carried out to assess the modifications introduced to the forest accounting at fair value - the experts were asked to express the level of approval for the statements regarding the reasonableness of the modification of the fair value model, as shown in Figure 1.

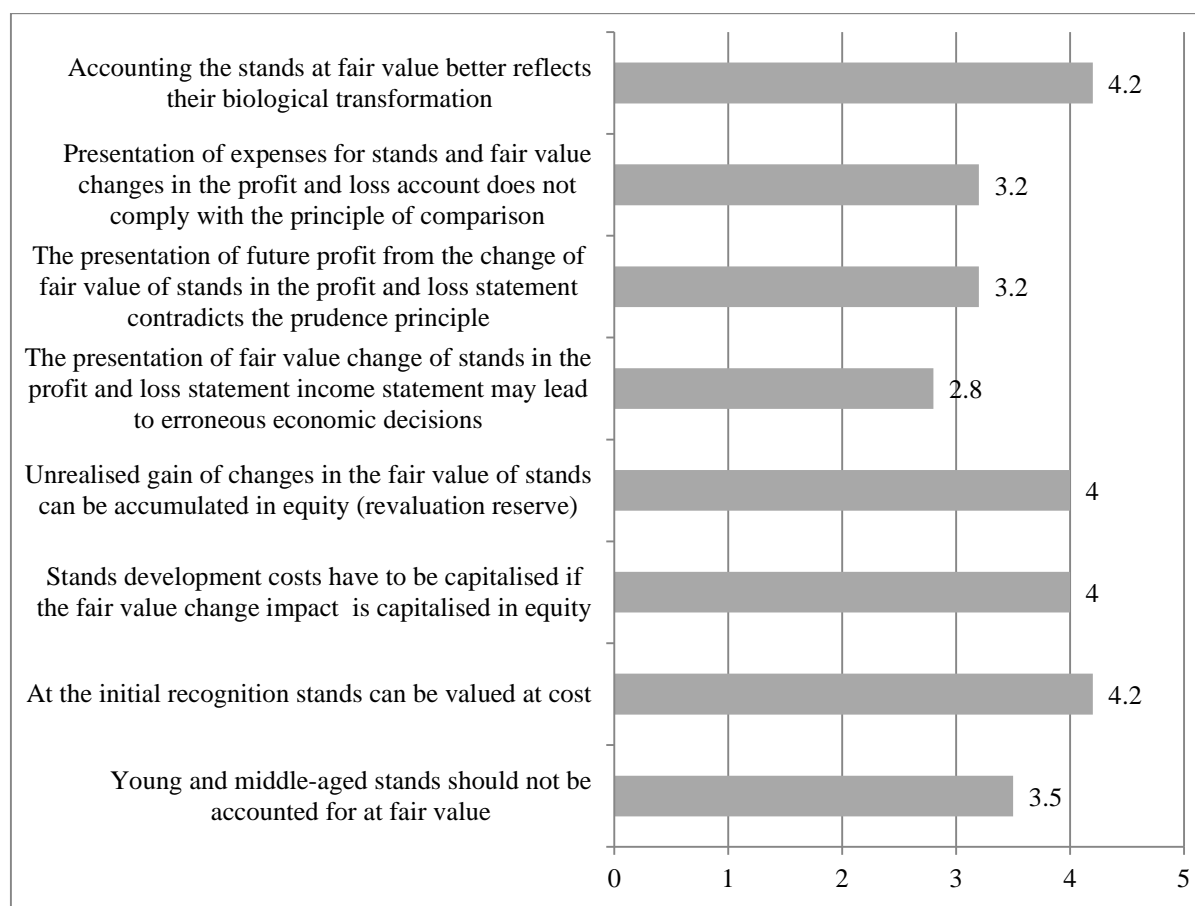


Figure 1. **The reasonableness of the modified fair value method**  
(source: compiled by authors, based on research findings)

The experts expressed a high level of acceptance of the statement that the fair value in the financial statements better reflects the forest biological transformation (mode: *Agree*), however, when evaluating the arguments regarding presentation of fair value changes in the profit and loss account, the respondents were less unanimous: they more strongly supported the argument that such presentation does not meet the principle of the comparison of income and expenses and determines the asymmetry of data submission (mode and median: *Agree*), however, the statement that presentation of changes in fair value in the profit and loss account may lead to erroneous economic decisions was given a critical evaluation (mode: *Disagree*; median: *Neither agree nor disagree*). Despite the lower level of expert agreement with the reasons for the need to modify the fair value method, the experts expressed a high level of approval for the modification of the method itself: the unrealised gain of the change in the fair value of the stands may be accumulated in the revaluation reserve (mode and median: *Agree*), in this case the costs of planting must be capitalised (mode and median: *Agree*), and at the time of initial recognition, stands can be evaluated at cost (mode and median: *Agree*). The experts demonstrated diverse attitudes to the *reasons* for the modification of the fair value method, thus, a low coefficient of concordance ( $W_r=0.35$ ) was obtained.

The research also aimed at examining the expert opinion on the principles of determining the fair value of forests. Only 4 out of 10 experts accepted the statement that the fair value of the stands could only be determined by applying valuation based on discounted cash flows (DCF). Most pointed out that the fair value could be determined using other public information on the prices of standing forest or roundwood, but agreed with the argument that the only suitable method for determining fair value for stands before reaching maturity is the methodology based on DCF. When assessing the level of expert approval for the proposed categories of inflows included in the DCF calculations, the highest expert approval was demonstrated for the statement that the future inflow from the stands could be determined by quoted prices of raw wood or standing forest (average score 4.3, mode and median: *Agree*). A rather unanimous opinion of the experts was found in the aspect of the expected cash payments to be included in the calculation of the DCF: the high level of acceptance was observed in the statements regarding all direct forest maintenance before the logging costs (average score 4.2, mode and median *Agree*), as well as forest recovery costs (average score 4.1, mode and median *Agree*). The most critically evaluated statement was regarding the inclusion of future administration and general expenses (average score 2.2, mode and median *Disagree*). After ranking the expert opinions the meaning of  $W_r=0.59$ , therefore, it can be stated that the expert opinions on this issue were sufficiently coordinated.

The expert opinions differed in evaluating the process improvement trends observed in the forest financial accounting at fair value. The experts supported the statement that forest financial accounting should be regulated (average score 4.6; mode *Strongly agree*). However, the experts' opinions differed in terms of the scope of regulation: half of the experts supported the statement that the accounting standards should be provided with a detailed methodology for determining the fair value of the forest (average score 3.4, mode and median *Agree*). However, the others have expressed a higher level of approval for claims that accounting standards should only include general guidelines for forest accounting, and that detailed methodologies should be established by the enterprises themselves in their accounting policies (average 3.6; mode *Strongly agree*, median *Agree*). These diverse opinions presented by the experts are reflected by the Kendall' coefficient of concordance ( $W_r=0.3$ ), which shows the low compatibility of opinions and poses an old issue with regard to whether accounting standards based on principles or rules are more beneficial to the stakeholders.

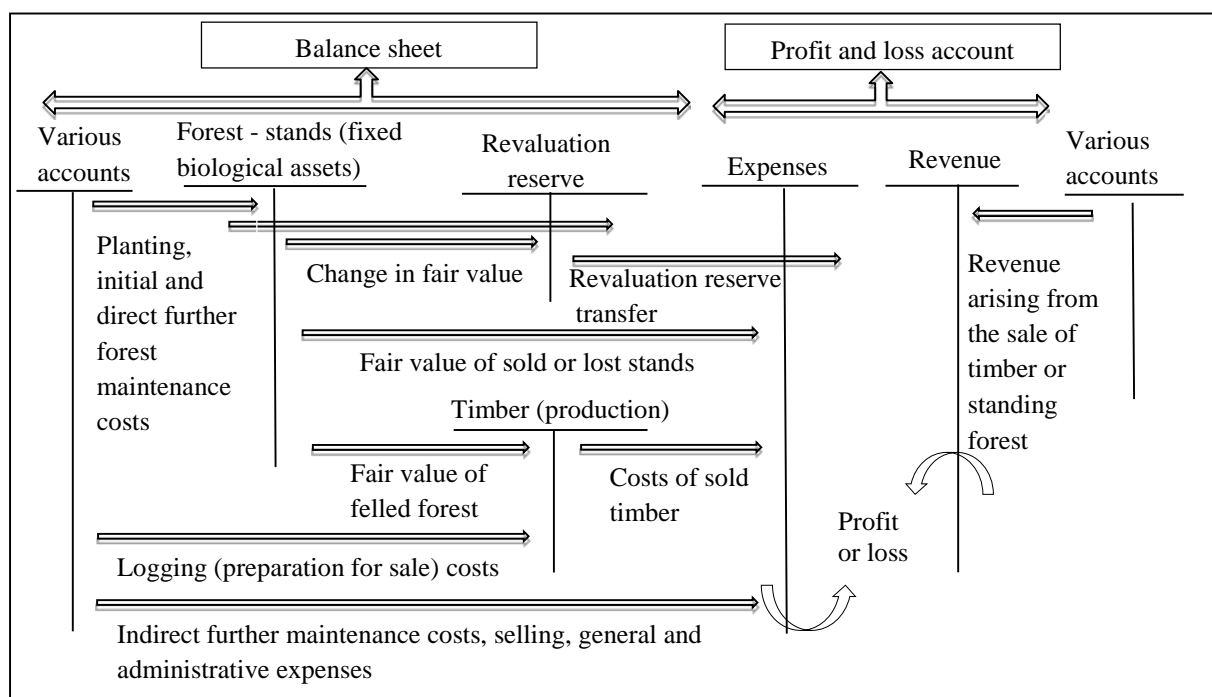


Figure 2. **A modified method of forest financial accounting at fair value**  
(source: compiled by the authors)

In order to minimize the shortcomings of the classical fair value method, the authors suggest the modification of it, as shown in Figure 3. According to the modified fair value method, the forest is presented in the balance sheet at fair value less estimated costs to sell (a valuable indicator for users of financial information), the fair value change is presented in the revaluation reserve and shall

be transferred to the profit and loss account when it is realised (no misleading information is provided to users of the financial statements, while the profit and loss account presents the actual results of the entity's activities and escapes the manipulation of profitability indicators). The method ensures that only the realised revenue is presented in the profit and loss account, whereas the fair value of the sold forest (timber), reduced by the amount of the accumulated revaluation reserve, would be the actual cost of the forest and recognised as expenses.

It should be recognised that the application of our modified method, as well as other methods based on fair values, may be complicated due to the annual determination of the fair value of the forest, and should therefore be proposed to *medium and large* local and, in particular, international and listed forestry enterprises that are relevant to the public and/or community, have many users of their financial information, who often better understand measurements at fair value rather than cost.

### **Conclusions and discussions**

1. When the fair value method is used for forest accounting, the financial statements reflect the forest biological transformation and its impact on the value, continuous information about changes in the value of the forest is presented, while these changes are directly related to the forecasts of the future cash flows. However, the fair value method applied in forest accounting has two basic shortcomings: 1) the presentation of the fair value change in the profit and loss account does not meet the revenue recognition criteria, can lead to false expectations for dividends and wrong assumptions for economic decision-making processes, 2) due to the lack of an active market, the determination of fair value of the standing forest is a subjective process, which can be reduced only by applying uniform assessment methods, revealing the fair value determination methods and assumptions in the explanatory notes.
2. The expert evaluation has shown that the experts were unanimous in expressing the approval of the appropriateness of the fair value method to be applied for accounting of forests managed by forestry enterprises and, despite a lower level of support to causes that triggered the need to modify the fair value method, expressed a high level of acceptance of the way of modification. The experts supported the DCF method for determining the fair value of the forest, however, they also emphasised that the fair value of the mature forest may be determined by other publicly available information.
3. The suggested modified method of forest accounting at fair value allows to minimise the shortcomings: the stands should be recorded and presented in the financial statements at cost up to the moment when the biotransformation

of stands starts to affect their fair value; thereafter, the stands should be annually revalued to fair value, the unrealised fair value gains or losses should be presented in equity (revaluation reserve), while the forest afforestation (reforestation) and further development and maintenance costs should be capitalised.

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